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Subject EPA Comments on Draft Exposure Factors and Fate & Transport Parameters

Attached are TTEMI's comments on the draft submittals. Both me and Jeremy Johnson, EPA's risk assessor, reviewed and concur on these comments. We should probably have a conference call in the near future to discuss if you have questions and comments.

EPA comments on Solutia Draft EFs and Fate & Transport Parameters.doc

## TARGET RISK LEVELS AND EXPOSURE FACTORS
## GENERAL COMMENT

1. The text states that the proposed exposure factors are consistent with Missouri's Risk-Based Corrective Action (MRBCA) Tier 3 process, which relies on the application of site-specific exposure factors (Missouri Department of Natural Resources [MDNR] 2004). The proposed exposure factors include MRBCA default values, but also other values from various U.S. Environmental Protection Agency (EPA) guidance. The text does not clearly explain why the MRBCA default exposure factors are not always applicable to this site, and it does not provide site-specific justification for the use of other exposure factors. The text needs to clearly identify site-specific information to justify the use exposure factors other than MRBCA default values.

## SPECIFIC COMMENTS

2. Section 3.2, Paragraph 2, Page 3. The inhalation exposure time for a construction worker is identified as 10 hours per day, while the MRBCA value is listed as 12 hours per day (MDNR 2004). The text does not explain why the MRBCA value is not used or what site-specific information is available to support the value used. The text needs to be revised to include this information.

3. Section 3.2, Paragraph 4, Page 3. The inhalation rate for both the on-site worker and construction worker assumes a certain level of activity and times spent at that activity while working at the site. The text does not specify what site-specific information was used as the basis for these assumptions. The MRBCA default value for non-residential workers to indoor air is 15 meters per day ($m^3$/day) while 6.5 $m^3$/day is proposed , and it is not clear why the MRBCA value was not used. The value proposed for the construction worker, 13.7 $m^3$/day, is not consistent with the MRBCA default value of 10 $m^3$/day. The text should provide site-specific information to support use of a value that deviates from the default.

4. Section 3.3, Paragraph 3, Page 4. The proposed soil ingestion rates are not consistent with MRBCA guidance. The value for the non-residential worker, 50 milligram (mg)/day, is not consistent with the MRBCA value for non-residential worker, 100

mg/day (MDNR 2004). This value is, however, consistent with the EPA default for an indoor worker, but not for an outdoor worker (100 mg/day) (EPA 2002). The proposed ingestion rate for the construction worker, 100 mg/day, is consistent with the MRBCA value, although it is not consistent with the EPA default value, 330 mg/day (EPA 2002). The text should be revised to either provide site-specific information to support the exposure factor for the non-residential worker, or the soil ingestion rate should be changed to be consistent with the MRBCA value (100 mg/day).

5. Section 3.4, Paragraph 6, Page 4. The proposed value for the exposed skin surface area, 4,714 square centimeters ($cm^2$), is consistent with the MRBCA default value (MDNR 2004); however, it is higher than the EPA default value of 3,330 $cm^2$ (EPA 2002). No changes are needed at this time.

6. Section 3.4, Paragraph 1, Page 5. The soil to skin adherence factors proposed for the site are not consistent with either the MRBCA or EPA default value. The proposed factors for non-residential worker and construction workers—0.1 $mg/cm^2$ and 0.3 $mg/cm^2$, respectively—are not consistent with the MRBCA value of 1.0 $mg/cm^2$. The value for non-residential worker is not consistent with EPA's value of 0.2 $mg/cm^2$ for industrial workers (EPA 2004). Although the proposed value of 0.3 $mg/cm^2$ for construction workers is consistent with the EPA value for construction workers, no site-specific documentation is provided to support the use of these values. Information should be provided to justify not using the MRBCA default value.

## FATE AND TRANSPORT PARAMETERS
## GENERAL COMMENT

1. The major concern with the fate and transport parameters is that many of these parameters presume all soils beneath the buildings are silty clay. The selection of fate and transport parameters must be consistent with the site-specific soil information. The Data Gaps Investigation (URS 2001) clearly shows that the sites of concern are located in areas of significant fill material and thus the soils are a mixture of fill and silty clay. This heavily impacts a number of assumptions, as described in the specific comments below.

## SPECIFIC COMMENTS

1. Section 2.1, Paragraph 4, Page 2. This section discusses the depth to subsurface soils to be used in the Johnson and Ettinger model as described in the MRBCA guidance. The proposed value to estimate the depth to subsurface soil source is the mean depth of all subsurface contamination at the source areas. This value leads to underestimation of potential migration to indoor air. To be protective requires use of the depth to the upper extent of the contamination. For example, at the Former FF building, tetrachloroethene and trichloroethene were detected in soils from 3 to 10 feet below ground surface (bgs). Rather than using the mean value of 7.5 feet bgs, the upper extent of contamination should be used—3 feet bgs. The depth of contamination values for all areas should be revised accordingly.

2. Section 2.1, Paragraph 1, Page 3. The text describes the rationale for selection of the capillary fringe thickness. It states that the soils layer just above the water table is silty clay and proposes a value of 192 centimeters (cm). However, a review of the information provided in Data Gap Investigation Report (URS 2001) clearly shows that in most of these areas, fill material is mixed with silty clay. Therefore, the capillary fringe would not be expected to have the same height as in a homogeneous silty clay layer. EPA (2003) suggests (see Table 11) that if subsurface materials have fines of between 50 and 85 percent (as expected in an area of fill material and silty clay), silt loam should be used to obtain an attenuation factor such as capillary fringe height. The suggested capillary fringe height for silt loam is 68.2 cm; this value should be used in the model.

3. Section 2.1, Paragraph 3, Page 3. The thickness of the vadose zone depends on the thickness of the capillary fringe. Specific Comment No. 2 notes a problem with the assumption for the capillary fringe, and addressing that problem necessitates recalculation of the vadose zone thickness.

4. Section 2.1, Paragraph 3, Page 4. This section presents a number of assumptions on the physical parameters of the vadose zone and the capillary fringe. No references are provided for all these physical parameters, so it is not possible to verify their validity. Previous sections of this text assumed that soil beneath these buildings is silty clay, which is not correct—it is a mixture of fill material and silty clay. Therefore, if the physical parameters are based on silty clay, they also are invalid and must be revised with references provided to support their use.

## REFERENCES


Missouri Department of Natural Resources. 2004. Missouri Risk-Based Corrective Action (MRBCA) Process for Petroleum Storage Tanks. January.

United State Environmental Protection Agency (EPA). 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER Directive 9355.4-24. Washington, D.C. December.

EPA. 2003. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. Office of Emergency Response. Washington, D.C. June

EPA. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Office of Superfund Remediation and Technology Innovation. EPA/540/R/99/005. OSWER 9285.7-02EP

URS. 2001. RCRA Facility Investigation Data Gap Investigation Report. John F. Queeny Plant, St. Louis, Missouri. October.